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Main Directions for Improving the Organization of the Radiation Diagnostics Service in Uzbekistan

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Annotation: Analytical material on the state of the radiation diagnostic service in Uzbekistan is presented, the role and place of high-tech types of radiation diagnostics in a comprehensive examination of patients is determined. A substantiation of the model of the radiology service system and priority areas for increasing the efficiency of organizing high-tech types of radiology diagnostics in Uzbekistan was carried out.

Keywords: radiology diagnostics, high-tech types of diagnostics. Main Directions of Perfection of Radiodiagnostics Services In Uzbekistan.

Currently, in the context of global processes caused by demographic, social and technological changes, in the health care system of the population of most countries of the world, there is a qualitative improvement in health services, in particular radiation diagnostics [5, 6, 10, 15, 16, 18, 19].

There is a rapid development of new diagnostic methods and techniques: magnetic resonance imaging (MRI), spiral computed tomography (SCT), positron emission tomography (PET), multi-slice spiral computed tomography (MSCT). At the same time, the issues of organizing the provision of expensive high-tech medical care (HTMC) are among the most pressing for the healthcare of Uzbekistan. First of all, this is due to the fact that HFMP has limited accessibility for the majority of the country's population, especially for residents of regions remote from the center. If we take into account that the health indicators of the country's population have recently been declining, then solving this problem is the most important national task [8, 9, 12-14].

At the same time, despite significant achievements in the field of medical and technical support for medical organizations, there is a haphazard approach to the acquisition of expensive equipment without taking into account the need for it, which significantly reduces the efficiency of using both financial resources allocated for medical and technical support and the medical equipment, as well as the availability of high-tech medical equipment for the population [1-4, 7, 11].

New economic conditions for the work of medical organizations in the context of state orders for volumes of medical care, the widespread development of high-tech medical care in federal and regional medical centers, and the continuous rise in cost of medical technologies, including modern methods of radiation diagnostics, determined the relevance of this study.

The purpose of the study is to develop and substantiate a model and priority areas for improving the organization of radiation diagnostics services in medical organizations of Uzbekistan (using the example of the Bukhara region).

Objectives of the study: study of the main problems and trends in the organization of radiology services based on literature data; development of a methodology for social and hygienic research into the problems of organizing a radiation diagnostic service; conducting a comprehensive assessment of the radiation diagnostic service in medical organizations of the Bukhara region based on statistical data, sociological survey and expert assessments; assessment of the role and place of high-tech types of radiodiagnosis (HFRD) in a comprehensive examination of patients with various pathologies and treatment methods; justification of the model of the radiation diagnostics system and priority areas for increasing the efficiency of the organization of IVLD; development of methodological approaches to determining the need for IVLD.

Material and methods

To study the problems of organizing radiation diagnostics in Uzbekistan, organizing the conduct of IVLD and developing mechanisms for their optimization, a methodology for social and hygienic research was created.

The sociological study included a sociological survey of patients and doctors of the radiology service in medical organizations.

A survey of the population was carried out in medical organizations of the Bukhara region. A total of 421 respondents were interviewed; the size of the sample population was determined according to the method of A.M. Merkova (1979). According to the survey, the average age of respondents was 40.8 ± 12.6 years, of which 87.4% were patients aged 18 to 65 years; the share of people of working age is 85.9%. Among the respondents, women predominated (60.4 ± 2.9%), men made up 39.6 ± 2.9%, which generally corresponds to the structure of patients of medical organizations by gender.

Data from a sociological survey of patients who underwent radiation examinations made it possible to identify the structure of leading diseases that determine referral to radiation methods of research, as well as patients' opinions on the organization of radiation diagnostic services in medical organizations.

A survey of radiology service doctors (226 respondents were interviewed) was conducted in public health institutions and private medical organizations. Of these, 11.6 ± 2.4% work in clinics, 37.2 ± 3.7% in hospitals, 7.0 ± 1.9% in hospitals, 34.9 ± 3.6% in other medical organizations. % of doctors, which corresponds to the structure of the network of medical organizations in the Bukhara region.

Among the reasons for referral for radiation studies, diseases of the nervous and musculoskeletal systems, connective tissues, neoplasms, genitourinary system, digestive, respiratory, endocrine system, trauma and consequences of trauma, poisoning, and metabolic disorders prevail. These classes of diseases determine 88.1% of the volume of radiological research performed.

The waiting time for the study is on average 10.9 ± 0.7 days, PVLD (MRI and SCT) is 11.7 ± 0.8 days, most patients undergo the study within a month from the date of receipt of the referral.

The presence of a queue for MRI, SCT examinations and ultrasound is noted by 25.6-32.6% of respondents; at the same time, 21.8 ± 2.6% of patients are sent for radiation examinations without sufficient justification, which leads to an excess of the workload of radiology service doctors compared to the norm (37.2% of respondents).

Most of the referrals for research are issued by medical specialists in clinics and hospitals, as well as by local doctors; the proportion of patients who independently applied for the study was high (8.6 ± 1.7%).

A significant proportion of patients (40.6 ± 2.9%) paid for diagnostic tests to some extent.

An important problem is the low awareness of patients about the purpose of the study (8.7 ± 1.7%), about preparation for the study (19.4 ± 2.4%), about the essence and safety of the method (22.7 ± 2.5%) , about the results of the study (32.0 ± 2.8%); Information is often provided by doctors in a form that is incomprehensible to the patient (29.1 ± 2.7%).

According to doctors, the main problems in organizing IVLD (SCT, MRI) are the high cost of studies for patients - 55.8 ± 3.8 per 100 doctors surveyed; organizational issues - 69.8 ± 3.7 (long queue, long wait for research - 44.2 ± 3.8; unregulated procedure for selecting and referring patients for research - 25.6 ± 3.3); 4.7 ± 1.6 respondents believe that IVLDs are practically inaccessible to patients.

In addition, there are significant problems among doctors with having and completing primary specialization in radiology (30.2 ± 3.5%): despite the formally high level of qualifications of doctors, more than half (69.8%) of respondents know insufficiently or not know the legal acts regulating the organization of radiation diagnostics services.

An expert assessment of the problems of organizing radiation diagnostics was carried out among the heads of healthcare authorities, government healthcare institutions, large private medical organizations and chief specialists of the Bukhara region using a modification of the classic version of the Delphi method. A total of 34 experts were interviewed. All experts had at least 10 years of experience in their specialty, a higher qualification category and (or) academic degree.

Statistical processing of the research results was carried out using the Statistica 6.0 program. To assess the reliability of the results obtained, the average error of the mean value (m) and the standard square (sigma) deviation were assessed.

Results and its discussion

According to state statistical reports, more than 6 million radiation examinations are performed annually in medical organizations of the Bukhara region, mainly X-ray (fluorographic) examinations (68.9%) and ultrasound (20.7%), which undoubtedly directly affects the level of radiation exposure to the population. In the total volume of studies performed, radiation diagnostic methods are in second place after laboratory diagnostics (14.8% of all studies, 24.4% of the total number of patients examined). In 2002-2006 the increase in the number of x-ray examinations in the clinic per 1000 visits was 23.2%, in the hospital per 100 hospitalized patients - 21.1%, the number of examinations per occupied doctor position increased significantly (by 16.6%)(Table 1).

In large medical organizations, the share of special studies is 21-26% of the total number of radiological studies. The number of MRI examinations has almost doubled over five years, from 12.7 to 25.5 thousand (by 101.0%), CT scans - from 13.9 to 24.2 thousand (by 73.9%) . In referrals for MRI diagnostics, studies of the brain (60.5%), spine and spinal cord (27.1%) predominate.

The appeal of the population mainly determines the demand for medical care, but, in addition, the determination of the need for the short and long term must be carried out taking into account the level of indicators calculated using expert estimates [17].

When organizing and planning VVLD, the following classes of diseases are the most significant in terms of morbidity: in children, respiratory diseases, injuries and their consequences, poisoning, diseases of the musculoskeletal system and connective tissue, nervous and genitourinary systems; in adolescents - respiratory diseases, injuries and their consequences, poisoning, diseases of the musculoskeletal system and connective tissue, genitourinary and nervous systems; in adults - diseases of the circulatory system, respiratory system, musculoskeletal system and connective tissue, genitourinary system, injuries and their consequences, poisoning.

The total proportion of injuries in the diagnosis of which IVLD methods are used (fractures of the skull and facial bones, intracranial injuries, fractures of the spine, trunk bones, other areas of the body, injuries of nerves and spinal cord, internal organs of the thoracic and abdominal areas, pelvis, complications of surgical and therapeutic interventions), accounts for 8.2% of the total number of injuries. In children and adolescents this indicator

- 7.0%, in adults - 8.4%.

The number of operations in which IVLDs are used (including operations on the brain, ear, some operations on the respiratory organs, heart, blood vessels, abdominal organs, kidneys and ureter, musculoskeletal system) amounted to 25.2% of the total number of operations, the largest number accounts for operations on the abdominal organs

- 11.8% and musculoskeletal system
- 12.2%.

An expert assessment of the problems of organizing a radiological diagnostic service, including IVLD, allowed us to obtain the following results(Table 2, 3).

Firstly, the level of provision of state, municipal healthcare institutions and private medical organizations with X-ray units and ultrasound equipment was 67.3% (in municipal medical organizations) and 96.2% (in federal medical centers) of what should be.

Secondly, MRI and SCT units are most in short supply in municipal medical organizations (12.4-18.3%).

Thirdly, the level of radiation control is 72.2-99.8% of what should be in various medical organizations. The most complete maintenance of MRI (74.7-90.2%) and SCT (67.5-81.8%), the worst indicators for ultrasound equipment (15.3-57.5%).

Fourthly, MRI (95.4-96.2% of the standard) and SCT (98.2-88.1%) are most fully used in regional medical organizations and federal medical centers. The least loaded equipment is for ultrasound (25.4%) and x-ray units (33.2%) in private medical organizations; Radiological equipment (42.3-63.3%) and ultrasound equipment (74.6-63.3%) in municipal and regional medical organizations are insufficiently loaded.

In this regard, when re-equipping medical equipment, experts give priority to high-tech equipment (SCT and MRI) in regional medical organizations and federal medical centers (4.5-4.8 points on a five-point scale); x-ray installations for state and municipal medical organizations (4.1-4.4 points); Ultrasound equipment for municipal and private medical organizations (4.8-4.5 points); radiological equipment for federal medical centers (4.6 points).

The efficiency of using medical equipment largely depends on the efficiency of medical personnel using it. Experts note the highest level of workload of medical personnel among ultrasound doctors in municipal and regional medical organizations (92.1-94.2%), MRI and SCT specialists in regional medical organizations and federal medical centers (88.7-94.9%). Low workload of radiology diagnostic service doctors in private medical organizations using x-ray research (40.3%), MRI and SCT (20.9-30.1%). In addition, experts recorded an extremely low degree of interaction between clinic doctors and radiology specialists, primarily when conducting MRI and SCT studies (1.2-1.3 points).

Experts noted a high level of staffing with radiology doctors in regional medical organizations, federal medical centers and private medical organizations (78.7-99.8%). At the same time, there is a shortage of radiologists (66.3%), specialists in ultrasound (54.2%), SCT (68.8%) and radiological studies (41.2%) in municipal medical organizations and specialists in radiological research in regional medical organizations (50.1%), which is consistent with staffing indicators according to the annual statistical reports of medical organizations.

Experts assessed the qualifications of radiologists and ultrasound specialists in municipal and regional medical organizations at a satisfactory level (3.1-3.5 points). The most qualified personnel are MRI and SCT specialists (4.3-4.7 points). At the same time, 4.1% of experts rated the level of knowledge among radiology doctors of the main legal acts regulating the organization of radiology diagnostics as high, 71.8% as satisfactory, and 20.8% as low.

In modern conditions, due to the accelerated updating of scientific knowledge and the introduction of new diagnostic technologies, the issue of continuous professional training and retraining of medical specialists in radiation research becomes important.

Experts named financial (46.5 ± 9.1%), production (16.7 ± 6.8%), social (16.7 ± 6.8%), and social problems as the most significant problems in the timely training of radiology doctors. Administrative (6.7 ± 4.6%); 6.7 ± 4.6% of experts said there were no problems.

The level of organization of medical care can be judged by the accessibility of various types of medical care to the population. Experts consider ultrasound (4.2-4.8 points) and X-ray examinations (4.0-4.9 points) to be the most accessible to the population. Experts rated the availability of MRI and SCT low (2.1–3.0 points). The accessibility of radiological examinations for the population is extremely low (1.1-1.6 points).

According to experts, at present there are practically no restrictions when prescribing radiation examinations from hospital doctors (4.5-5.0 points). Clinic doctors are somewhat limited (mainly by accessibility to the population) in prescribing MRI (3.8 ± 0.5 points) and SCT (4.0 ± 0.5 points). At the same time, experts note that the level of general knowledge of almost all types of radiation examinations (indications, contraindications, etc.) among clinic doctors is below satisfactory (2.0-3.1 points); and according to MRI, SCT - from hospital doctors (2.2-3.0 points). Doctors practically do not know the specifics of conducting radiological studies (1.1-2.2 points). The quality of VVLD knowledge among doctors is evidenced by the low level of justification for referring patients for MRI and SCT (21.8-35.4% for clinic doctors and 44.2-57.1% for hospital doctors) in municipal medical organizations (15.3- 20.5%).

Experts have identified the main problems that arise for attending physicians when making referrals to patients for IVLD (MRI and SCT):

- low accessibility for patients (68.4 ± 8.5 per 100 experts surveyed);
- long queue, long wait for the examination for the patient (8.6 ± 5.1);
- lack of procedure for selecting and referring patients for examination (66.5 ± 8.6);
- high cost of research for patients (84.8 ± 6.6).

The conducted socio-hygienic study made it possible to assess the problems of organizing and providing IVLD, identify priority areas for improving the radiology service, and develop a methodology for calculating the need for the main types of radiology in Uzbekistan.

The main goal of developing the radiology service in Uzbekistan is to build a modern, accessible, clinically and economically sound system for diagnosing major diseases at each level of medical care (outpatient and inpatient), aimed at improving the quality and efficiency of medical care.

We consider the following priority areas in improving the provision of IVLD in Uzbekistan:

- creation of a system for selecting and referring patients for IVLD, which will improve the efficiency of the use of expensive medical equipment for MRI, SCT and radiological studies, the availability of studies for patients and reduce the waiting time for the study;
- equipping medical organizations with modern equipment for radiation diagnostics in accordance with the type of medical organization;
- creation of a system for informing patients about radiation examinations;
- advanced training of doctors of the radiology service and doctors of medical organizations in accordance with certain priorities;
- development of diagnostic research standards for major diseases;
- determination of the state order (quotas) for high-intensity respiratory therapy for medical organizations and municipalities.

The three-level model of the system for selecting and referring patients for IVLD assumes a technological stage of diagnostic activities - from conducting screening studies at the level of primary health care to IVLD in regional and federal medical centers. In addition, increasing the accessibility of modern radiation diagnostic methods for the population can be achieved through the introduction of modern telemedicine technologies(Fig. 1).

The main types of professional training for each category of doctors in the radiology diagnostic service: for radiologists - primary specialization and advanced training at a medical university; for ultrasound doctors - primary specialization, advanced training at a medical school and on-the-job specialization in leading medical centers; for medical specialists in MRI and RCT - clinical residency and on-the-job specialization in leading medical centers; for radiologists - clinical residency and on-the-job specialization in leading medical centers.

Measures to ensure the appropriate quality of the radiology service involve the creation of a system for ensuring and monitoring the quality of medical care based on the standardization of resource support for the radiology service, diagnostic and treatment processes and monitoring the effectiveness of the diagnostic and treatment process; development and implementation of standards (protocols and algorithms) for the provision of diagnostic and treatment care, provision of medical equipment, hospital forms, indications for hospitalization and referral to IVLD; implementation in medical organizations (radiology departments) of a quality management system based on international standards ISO 9001:2000.

New organizational technologies for supporting the activities of radiology departments, tested and implemented at the Bukhara State Medical Institute, involve the integration of various types of radiology diagnostics. The radiology department consists of an administrative service, a consultative and diagnostic unit and a support service. The administrative service includes the head of the department - an experienced radiation diagnostics doctor with training in the specialty "Public Health and Healthcare Organization", and a manager who organizes the conduct of research, as well as monitoring the life cycle of the department. Depending on the functional tasks and level of the medical organization, the consultative diagnostic unit includes x-ray rooms, ultrasound rooms, MRI, SCT, PET, radiological and other types of radiation studies; In medical organizations providing high-tech medical care, an X-ray operating room is organized. The support service includes an engineering group and a supply department.

The main objectives of the radiology department are the complexity and integration of various types of diagnostic studies, the introduction of diagnostic algorithms in order to obtain complete and reliable diagnostic information in the shortest possible time; development and implementation into practice of economically sound, clinically effective diagnostic methods, new organizational forms of work.

Methodological approaches to determining the need for IVLD involve analyzing the population's appeal for medical care, the level of morbidity, the medical technologies used, conducting an expert assessment and, on their basis, calculating the need for types of diagnostics, the necessary resources, including for the formation and justification of targeted medical programs.

To meet the need for IVLD in traumatology and orthopedic patients, an additional 27.2 thousand studies will be required in the medium term; to ensure VMP - approximately 1.5 thousand IVLD (primary need). To provide specialized inpatient care, 17.6 thousand studies will be required, of which 5.9 thousand studies will be required for patients requiring surgical treatment (a vital need). The need for patients in need of outpatient care is 19.8 thousand studies (deferred need).

Thus, with the resources available in the Bukhara region and the effective organization of IVLD in the medium term, the need for IVLD in patients requiring VMP and surgical interventions can be fully satisfied; partially (58%) - in patients in need of inpatient medical care.

Conclusions

1. Until now, planning of the resource base of diagnostic services is carried out, as a rule, without serious study of economic aspects and a comprehensive analysis of the level and structure of morbidity in the population.
2. The resource base of the radiation diagnostics service in medical organizations of the Bukhara region allows us to fully carry out the entire range of radiation examinations to all patients in need.
3. According to doctors at the radiology diagnostic service, there is a high demand for radiological research methods, primarily MRI, SCT and ultrasound.
4. The most significant problems in organizing and conducting IVLD are the low level of equipment of medical organizations with MRI and SCT, primarily in municipal medical organizations, as a result of this - low availability for patients of IVLD, especially MRI and SCT; high cost of IVLD for patients, primarily MRI and SCT; the lack of a procedure for selecting and referring patients for examination and, as a result, the unreasonable referral of patients to radiation methods, primarily

MRI and SCT, by doctors at clinics; low level of knowledge of MRI, SCT among attending physicians in clinics and hospitals; low level of professional training of radiology doctors in IVLD.

5. The proposed model for organizing a radiation diagnostic service in Uzbekistan creates a unified information space and ensures the availability of the most modern technologies for the entire population, regardless of place of residence. The model involves equipping primary care institutions with medical equipment and creating high-tech centers (VMP with VVLD), includes a three-level provision of medical organizations with equipment for radiation diagnostics and the use of telemedicine technologies.
6. The use of new organizational technologies to support the activities of radiation diagnostics services in medical organizations (using the example of the clinic of the Bukhara State Medical Institute) allows for a 1.5-2-fold increase in throughput and efficiency in the use of expensive medical equipment with the proper quality of radiation examinations(Fig. 3).
7. The priority areas for improving the provision of IVLD in Uzbekistan are equipping medical organizations with modern equipment for radiological diagnostics, improving the qualifications of radiology doctors and doctors of medical organizations in accordance with certain priorities; determination of state orders (quotas) for medical organizations and municipalities on VVLD.
8. The priority types of professional training for each category of radiology doctors are for radiologists - primary specialization and advanced training at a medical university; for ultrasound doctors - primary specialization, advanced training at a medical school and on-the-job specialization in leading medical centers; for medical specialists in MRI and SCT - clinical residency and on-the-job specialization in leading medical centers; for radiologists - clinical residency and on-the-job specialization in leading medical centers.
9. Methodological approaches to determining the need for IVLD in Uzbekistan make it possible to calculate the need and volume of IVLD for providing inpatient, outpatient care and high-tech medical care based on an analysis of morbidity, medical technologies for inpatient treatment and determining the consumption coefficients of IVLD for medical organizations at different levels.

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